Product Technical Manual

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Product Name：Spray polyurethane rigid Foam composite material for LNG Carriers

Version：V 3.2

Product Introduction

Spray polyurethane rigid Foam composite material for LNG Carriers utilizes environmentally friendly blowing agents to achieve ultra-low thermal conductivity. Compatible with WANNATE®2208, the foam is suitable for construction on concrete surfaces, brick surfaces, wood substrates, and other common base materials with strong adhesion, stable dimensions, and superior flame resistance. Flame retardancy meets B2 fire rating (GB 8624-2012).

Product Usage

The composite material for LNG Carriers is fast-curing system to enable immediate load-bearing capacity and meets construction demands in spray insulation applications. Prior to full-scale application, mandatory trials must be conducted to validate material performance under specific project conditions.

Physical and Chemical Properties

Item	Specification
Viscosity at 25 ℃, mPa s	40~250
Density, g/cm^3	1.10±0.10
Color	Colorless or light yellow

Free Foaming Parameters

Item	Specification
Cream Time，s	2~3
Gel Time，s	8~10
Tack-Free Time，s	10~13
Free-Rise Density，kg/m^3	27~33

Physical Properties

Item	Specification
Density，kg/m^3	≥37
Thermal Conductivity，W/(m ｋ)	≤0.024
Compressive Strength (at 10% deformation)，kPa	≥150
Dimensional Stability (70 ℃, 48h)，%	≤1.5
Closed Cell Content，%	≥90
Water Absorption，%，	≤3

（1）Foaming Requirements: Material Temperature: 25 ℃, Mixing Ratio: 1:1 by volume, Mixing Method: Manual blending with electric stirrer at 2500r/min

（2）When operated in strict compliance with the equipment usage precautions described in this document, the high-pressure spraying equipment produces foam products with an overall density exceeding 37 kg/m ³

（3）The technical parameters herein are derived from laboratory testing and may deviate under actual application conditions. These values are provided for reference only and do not constitute legally binding obligations.

Usage Precautions

The construction equipment of composite material for LNG Carriers is high-pressure spray machine. Verify delivery ratio of Component A (Black) to Component B (White) and calibrate mixing pressure before the construction.

The ambient temperature for spraying operations should be maintained between 10 ℃ and 40 ℃, with wind speed not exceeding 5m/s (equivalent to Grade 3 wind) and relative humidity <75%. Outdoor construction is prohibited on rainy days. If the ambient temperature during construction falls below 10 ℃, reliable technical measures must be implemented to ensure spraying quality.

During the spraying operation, control the feed temperature of two components above 30 ℃, ensure that the substrate is dry and clean. Per-pass thickness is 1-1.5cm (excluding the base layer). Subsequent layers can only be applied after the previous layer achieves a tack-free surface (tested by finger touch). Other relevant standards shall comply with national regulations. If the above conditions are not met, all responsibilities shall be borne by the buyer.

Spraying operations is in accordance with GB 50404-2017 “Technical Code for Rigid

Polyurethane Foam Insulation and Waterproofing Engineering".

The construction site shall be designated as a non-fire area, maintained well-ventilated, and kept away from ignition sources. Smoking is strictly prohibited. When hot-work operations are conducted nearby, the hot-work approval system must be strictly implemented, with corresponding safety measures and specialized personnel supervision in place.

Prior to the formal construction of the project, the buyer must conduct a trial test in an environment consistent with the actual construction conditions to verify the reliability of the composite material in the specific application. Upon commencement of formal construction, it shall be deemed that the buyer has confirmed the product's performance inspection as qualified. If the above procedures are not followed, all responsibilities shall be borne by the buyer.

Packing Details

200-liter green iron drum

Storage (Usage) Precautions

The composite material should be stored in closed containers to avoid absorbing moisture. Therefore, during storage and transportation, the containers must remain dry and tightly sealed.

The composite material should be sealed and stored at room temperature (5℃ to 35℃), well-ventilated, and shaded area. Avoid direct sunlight or long-term storage above 40℃, which may accelerate the volatilization of blowing agents, thereby reducing foam performance

Expiration Date

Under suitable storage conditions, the storage period of the composite material is 6 months. After more than 6 months, it can continue to be used upon passing qualification tests.

Safety Precautions

Direct contact with the composite material may cause moderate eye irritation and mild skin irritation, potentially leading to skin allergies. Repeated inhalation of high-concentration vapors can induce respiratory allergies. Immediate medical attention should be sought, and anti-inflammatory and anti-allergic symptomatic treatment measures should be administered.

During operation, exercise caution to prevent direct contact with skin or splashing into eyes. Wear necessary protective equipment (gloves, protective goggles, work clothes, etc.).

In case of skin or eye contact, rinse immediately with clean water for at least 15 minutes. Wash the skin with soapy water and seek medical attention if necessary. If accidentally ingested, seek immediate medical treatment for symptomatic management.

Fire and Explosion Hazards

This product is not classified as flammable liquids, explosives, oxidizers, corrosives, toxic substances, or radioactive hazardous materials during storage and transportation. It is not categorized as a hazardous product.

Carbon dioxide, foam, or chemical dry-powder fire extinguishers can be used. If no other fire-extinguishing agents are available, a large amount of water mist can be sprayed. Once the fire is extinguished, the spilled materials must be thoroughly cleaned (refer to the "Spill and Leakage Handling" section).

Fire-Fighting Procedure: Standard protective measures.

Spill and Leakage Handling

Small amounts of leaked or spilled materials can be rinsed away with water. In case of large-scale leakage, contain and recover the materials, and wash the contaminated ground with water or detergent. The disposal of waste composite materials must comply with the local government's environmental protection regulations.

For more information, please refer to the Safety Data Sheet (SDS) of our products or contact our Customer Service Center.

The indicators and data provided in this document are based on our current level of technical knowledge and practical experience, and are for reference only. Specific guaranteed indicators are subject to the quality assurance certificate or supply contract. The user is

responsible for testing the products purchased from our company to verify their suitability for their intended processes and applications, and to achieve the desired objectives. Further application and processing of our products are beyond our control. Therefore, our liability for the products provided is limited to the portion delivered by us and used by you. We do not assume responsibility for indirect losses incurred during the production process using our products as raw materials. Our technical support and customer service center are available to provide consultation and technical services related to our products. We welcome your inquiries and communication via mail or phone.

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